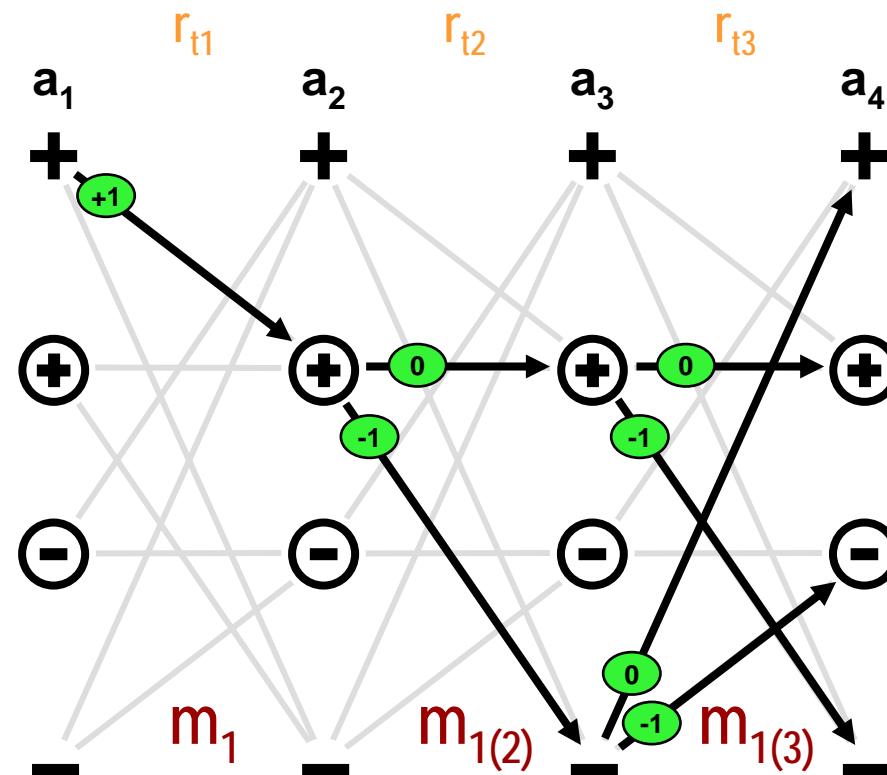


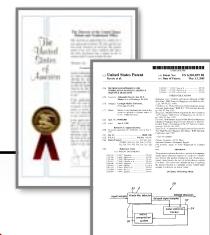
Exhibit A

Part 5

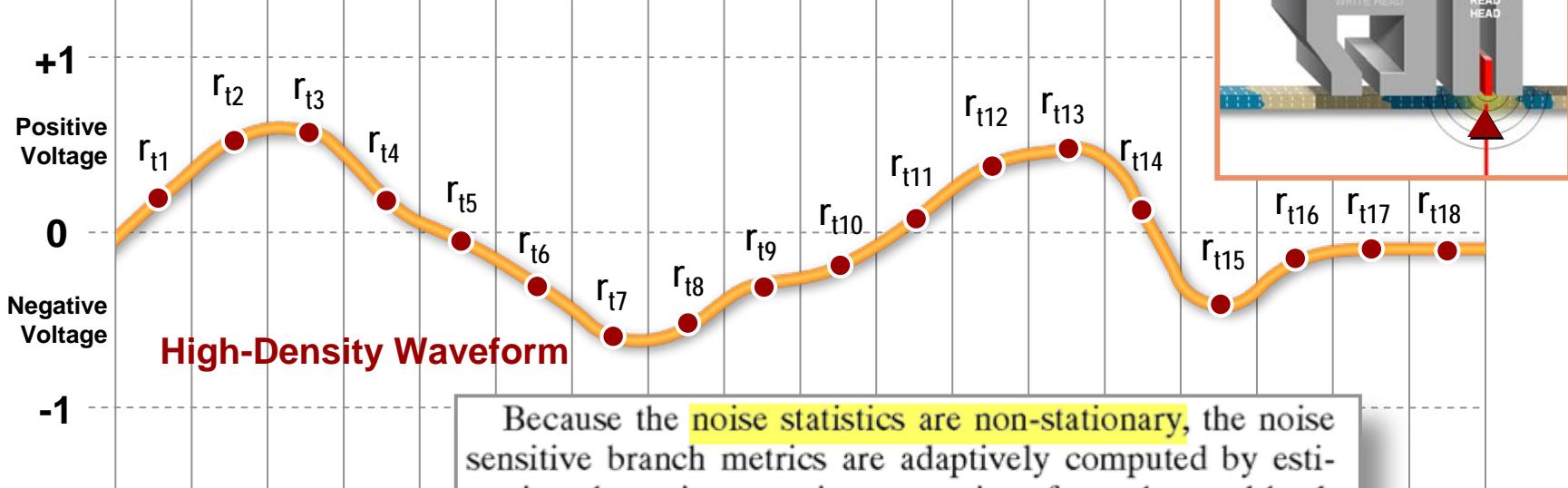
Kavcic-Moura Branch Metrics



$$BM_1 = \log \sigma_1^2 + \frac{[(r_{t1}-m_1) + w_{1(2)} \cdot (r_{t2}-m_{1(2)}) + w_{1(3)} \cdot (r_{t3}-m_{1(3)})]^2}{\sigma_1^2}$$



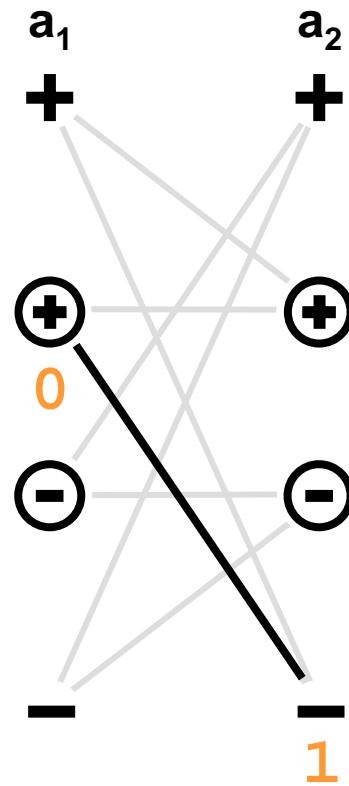
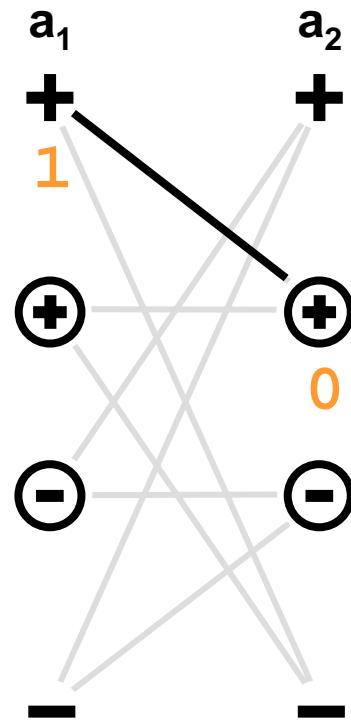
Tracking the Noise Statistics



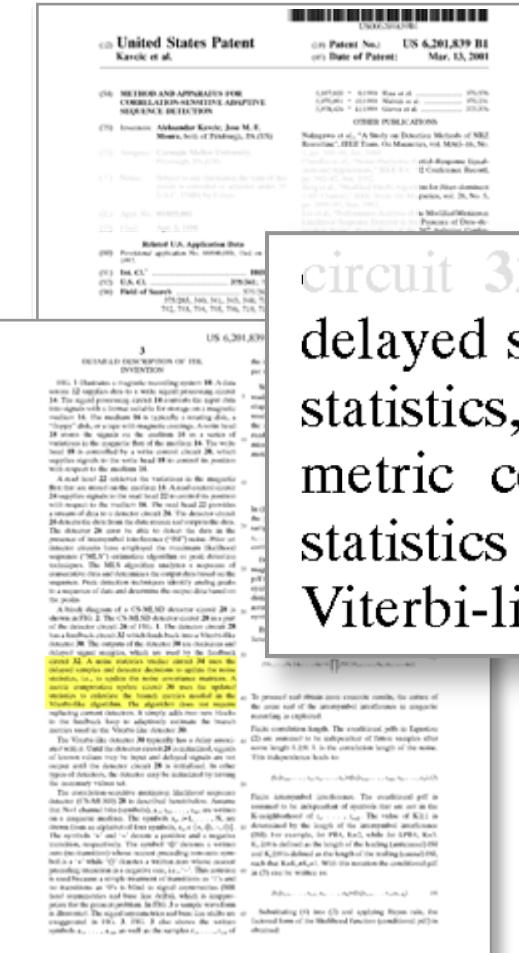
$$BM_1 = \log \sigma_1^2 + \frac{[(r_{t1}-m_1) + w_{1(2)} \cdot (r_{t2}-m_{1(2)}) + w_{1(3)} \cdot (r_{t3}-m_{1(3)})]^2}{\sigma_1^2}$$

Source:
'839 Patent (2:15-20)

Calculating Accurate Branch Metrics



The Kavcic-Moura Patents

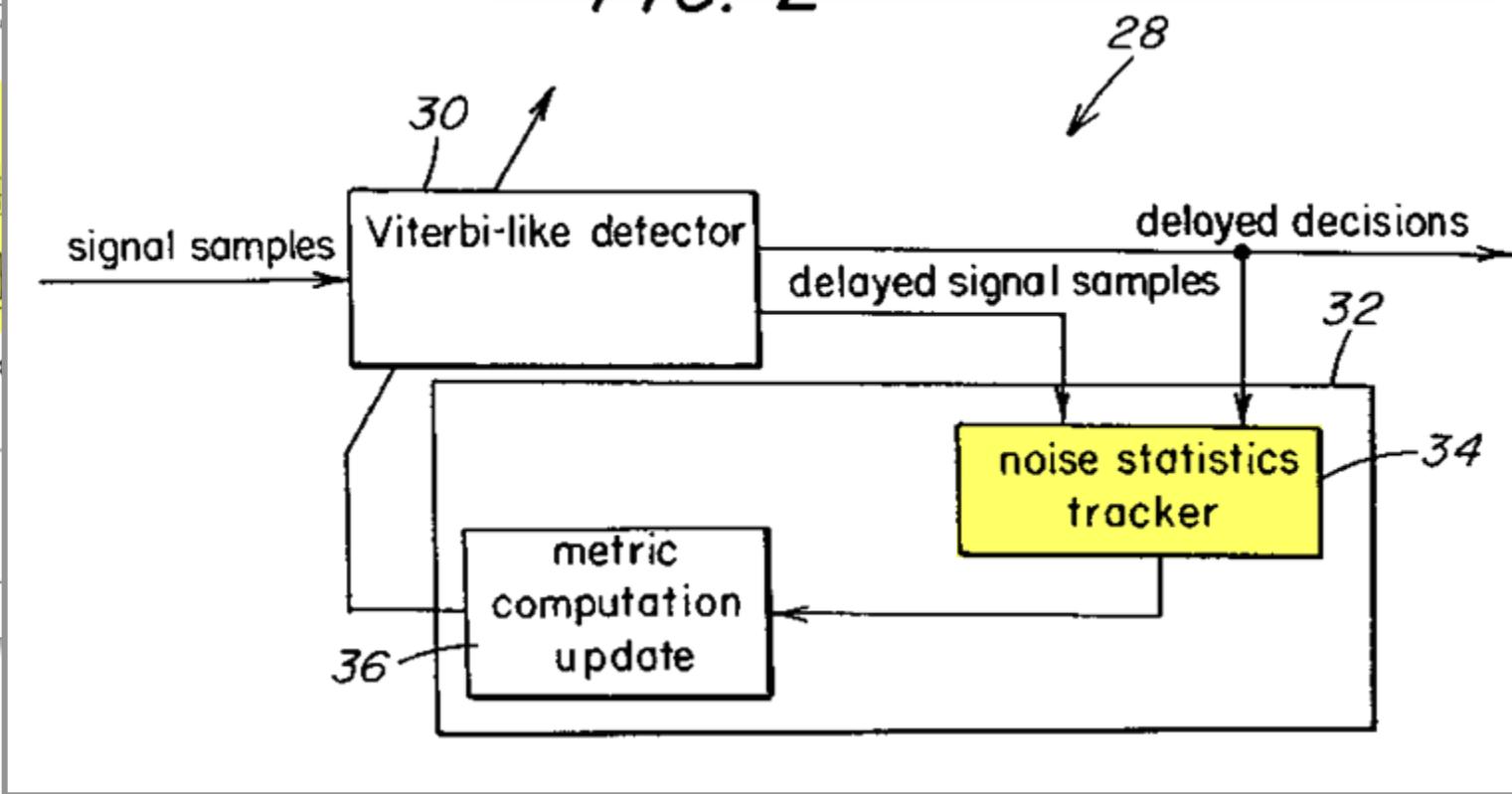
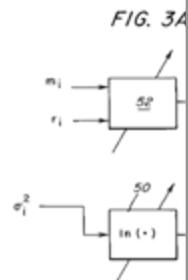
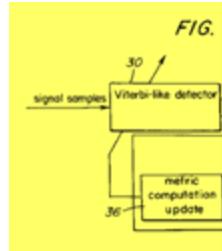


circuit 32. A noise statistics tracker circuit 34 uses the delayed samples and detector decisions to update the noise statistics, i.e., to update the noise covariance matrices. A metric computation update circuit 36 uses the updated statistics to calculate the branch metrics needed in the Viterbi-like algorithm. The algorithm does not require

The Kavcic-Moura Patents



U.S. Patent Mar. 13, 2001 S



Source: '839 Patent
(11:16-19)

Branch Metric Computation Module

The adaptation of the vector of weights \underline{w}_i and the quantity σ_i^2 as new decisions are made is essentially an implementation of the recursive least squares algorithm. Alternatively, the adaptation may be made using the least mean squares algorithm.

The quantities m_i that are subtracted from the output of the delay circuits 54 are the target response values, or mean signal values of (12). The arrows across multipliers 56 and across square devices 58 indicate the adaptive nature, i.e., the data dependent nature, of the circuit 52. The weights \underline{w}_i and the value σ_i^2 can be adapted using three methods. First, \underline{w}_i and σ_i^2 can be obtained directly from Equations (20) and (16), respectively, once an estimate of the signal-dependent covariance matrix C_i is available. Second, \underline{w}_i and σ_i^2 can be calculated by performing a Cholesky factorization on the inverse of the covariance matrix C_i . For example, in the $L_i D_i^{-1} L_i^T$ Cholesky factorization, \underline{w}_i is the first column of the Cholesky factor L_i and σ_i^2 is the first element of the diagonal matrix D_i . Third, \underline{w}_i and σ_i^2 can be computed directly from the data using a recursive least squares-type algorithm. In the first two methods, an estimate of the

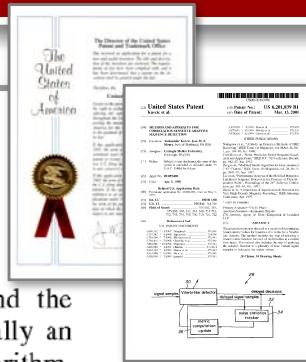
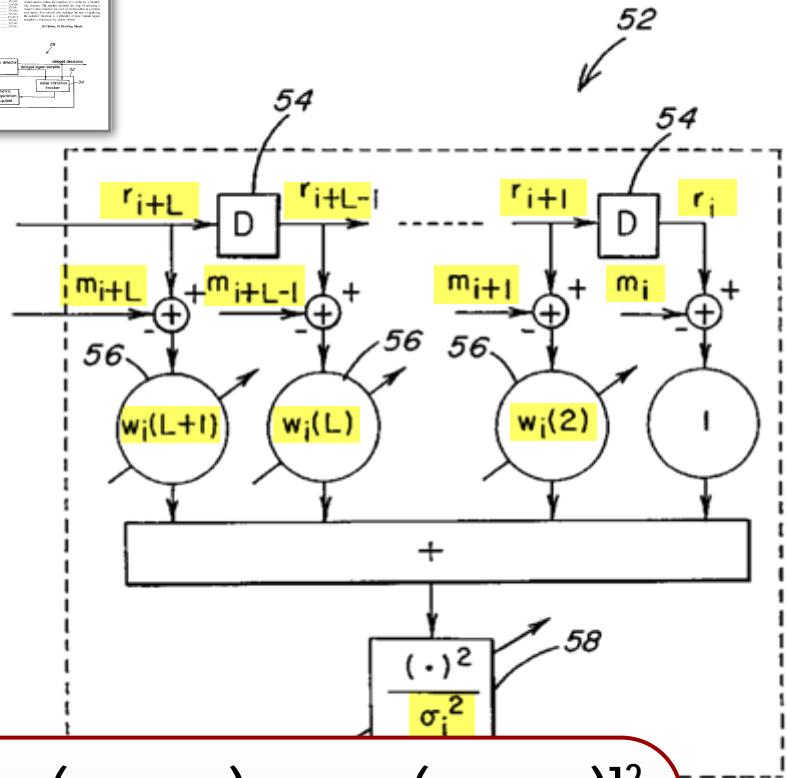


FIG. 3B

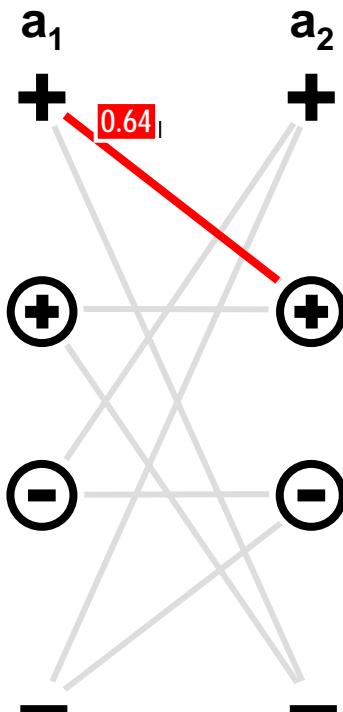


$$BM_1 = \log \sigma_1^2 + \frac{[(r_{t1}-m_1) + w_{1(2)} \cdot (r_{t2}-m_{1(2)}) + w_{1(3)} \cdot (r_{t3}-m_{1(3)})]^2}{\sigma_1^2}$$

Source:

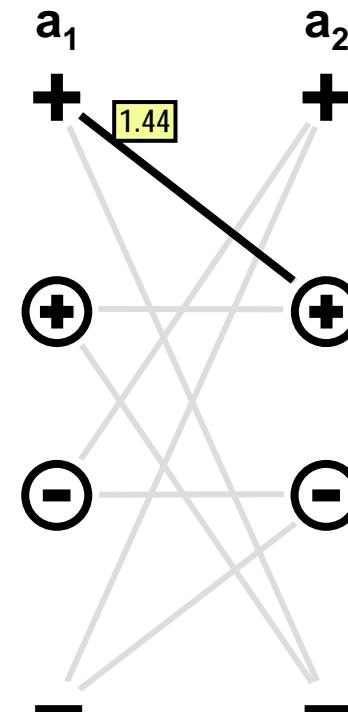
'839 Patent (8:1-21)

Calculating Accurate Branch Metrics



Prior Art

$$BM_1 = (r_{t1} - m_1)^2$$

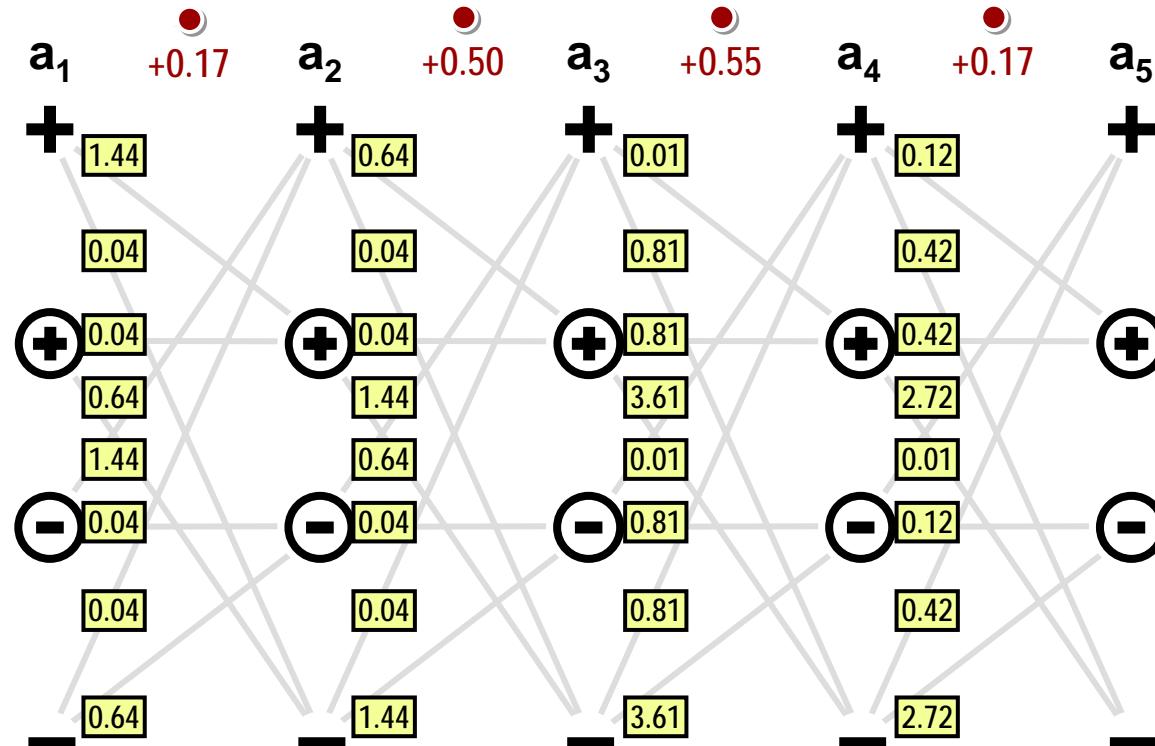


Kavcic-Moura Patents

$$BM_1 = \log \sigma_1^2 + \frac{[(r_{t1}-m_1) + w_{1(2)} \cdot (r_{t2}-m_{1(2)}) + w_{1(3)} \cdot (r_{t3}-m_{1(3)})]^2}{\sigma_1^2}$$

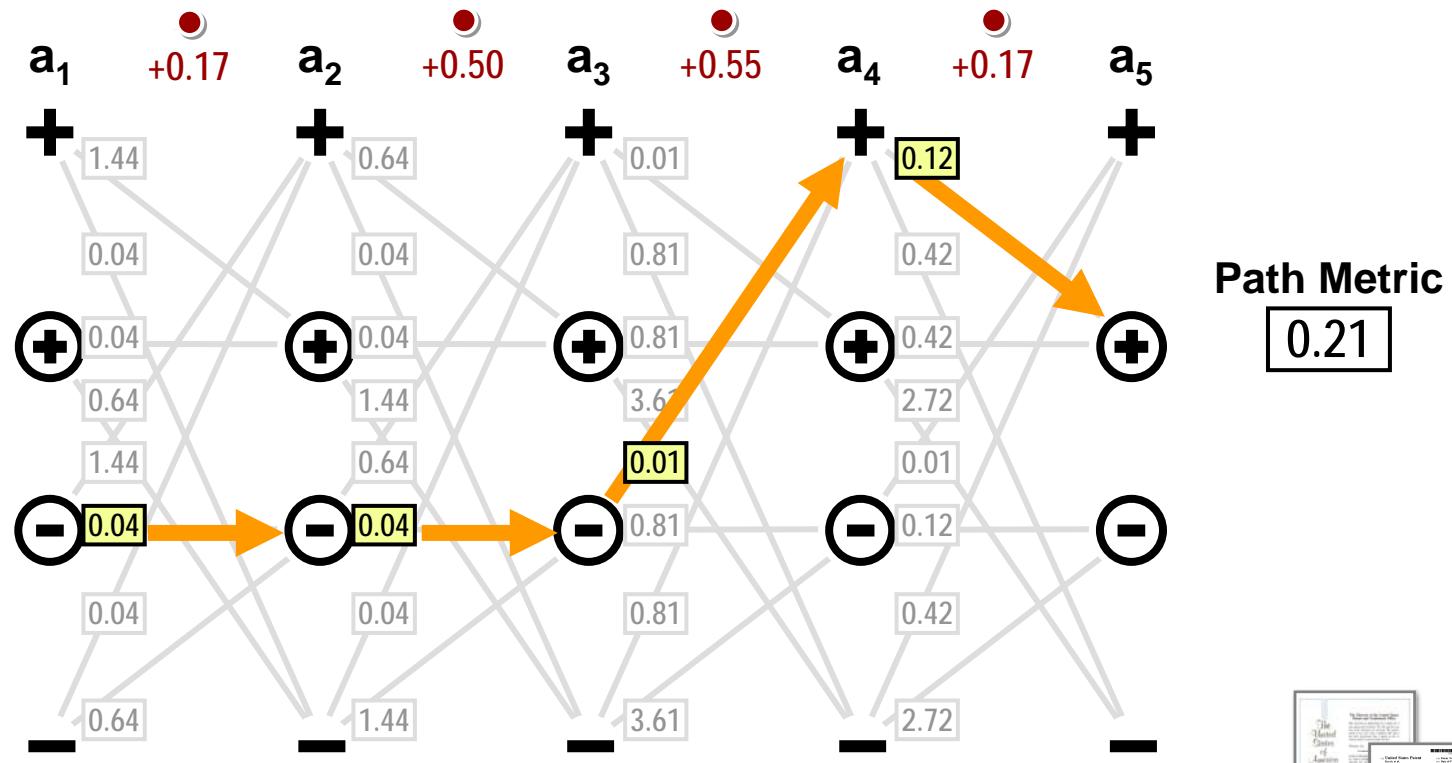


Kavcic-Moura Branch Metrics

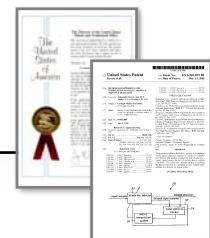


$$BM_1 = \log \sigma_1^2 + \frac{[(r_{t1}-m_1) + w_{1(2)} \cdot (r_{t2}-m_{1(2)}) + w_{1(3)} \cdot (r_{t3}-m_{1(3)})]^2}{\sigma_1^2}$$

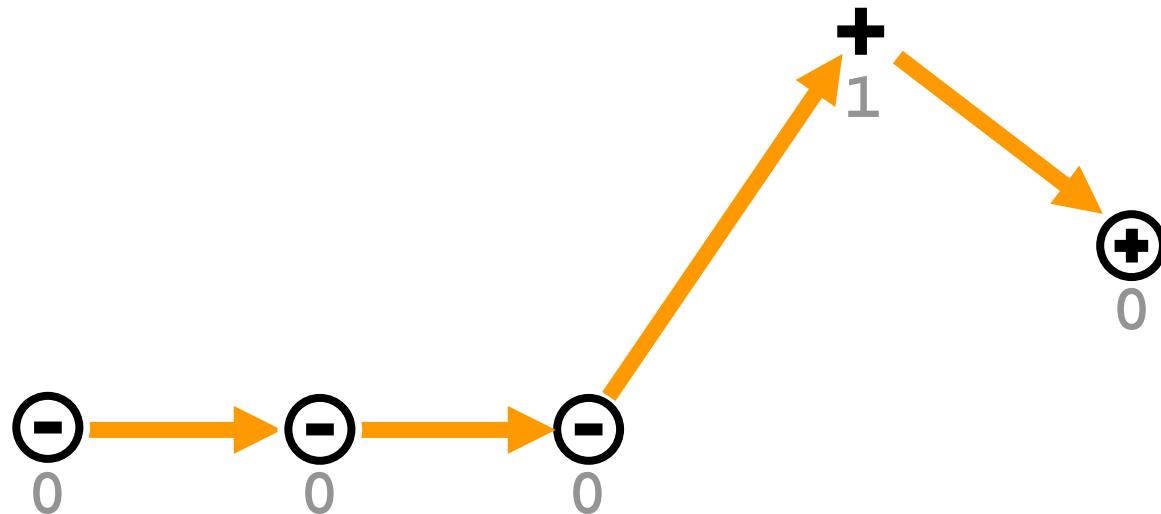
Path Metric



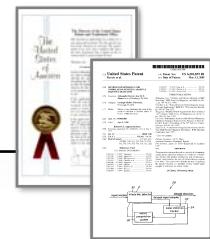
The path with the lowest cumulative total is the most likely bit sequence



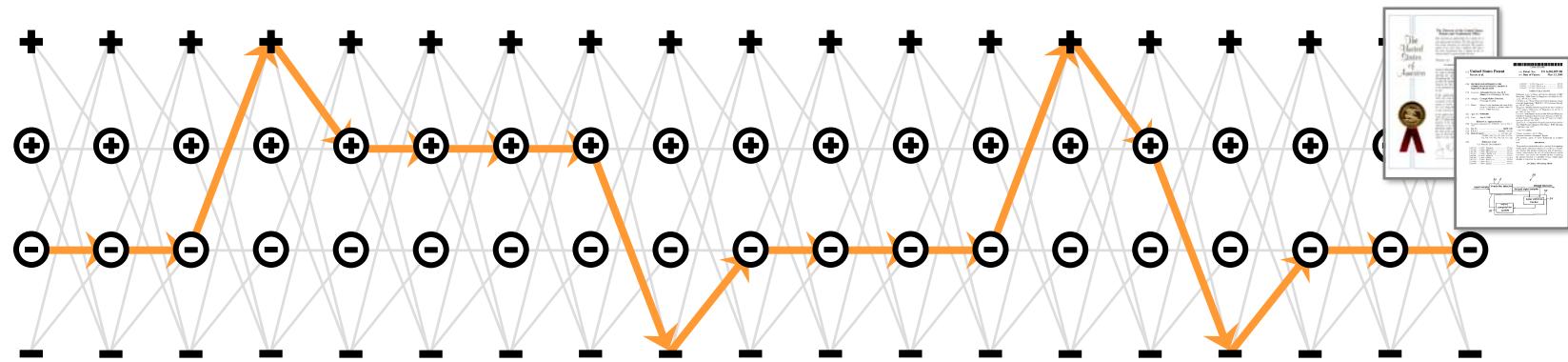
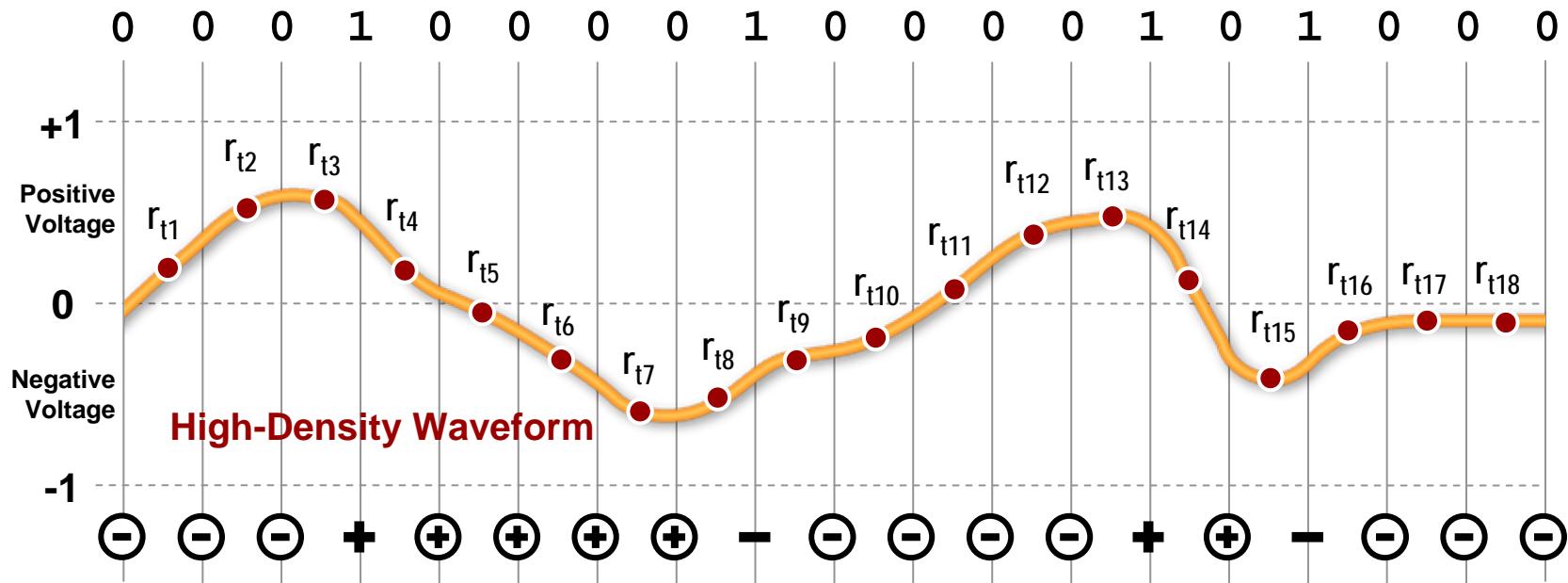
Most Likely Bit Sequence Found



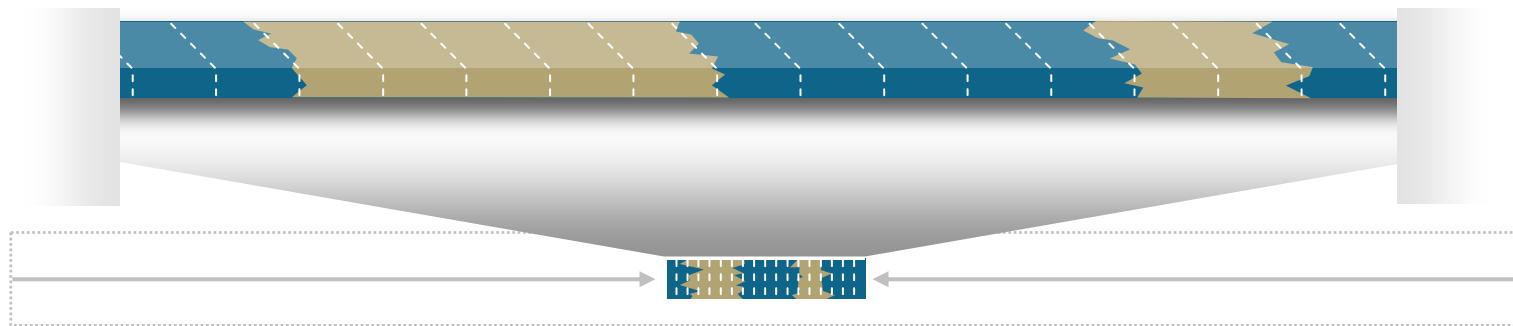
The path with the lowest cumulative total is the most likely bit sequence



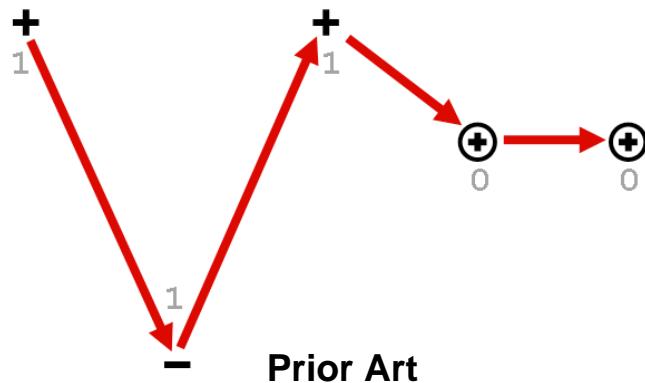
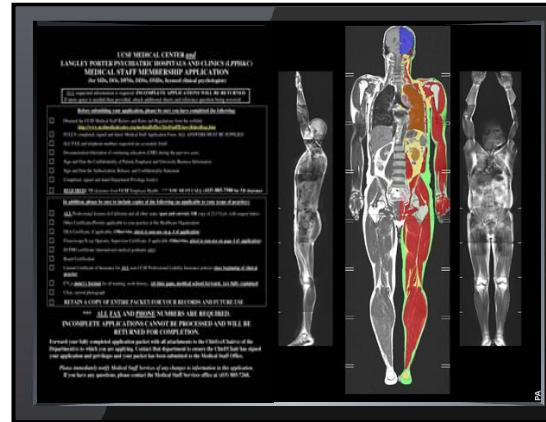
Determining the Bit Sequence



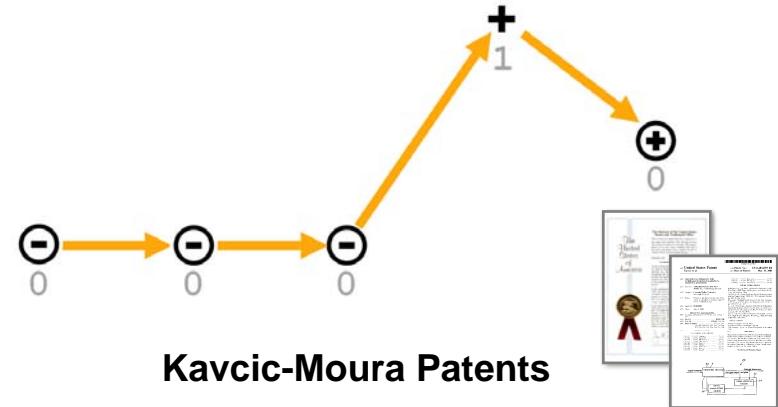
0 0 0 1 0 0 0 1 0 0 0 0 1 0 1 0 0 0 0



Calculating Accurate Branch Metrics



$$BM_1 = (r_{t1} - m_1)^2$$



$$BM_1 = \log \sigma_1^2 + \frac{[(r_{t1}-m_1) + w_{1(2)} \cdot (r_{t2}-m_{1(2)}) + w_{1(3)} \cdot (r_{t3}-m_{1(3)})]^2}{\sigma_1^2}$$

The Kavcic-Moura Patents



insensitive detectors. It has also been demonstrated that the performance margin between the correlation sensitive and the correlation insensitive detectors grows with the recording density. In other words, the performance of the corre-

above
1990, N
accord
weighted
1990-1994
13.2%
total a
1990
LPMR
higher
of 0.84
cigar. N
the resp
LPMR
be also
special
as 1990
of 100%
doubt
will a
against
the EPP

a separation of 2.0%. The recording density corresponds to a squared density of 3 symbols/PW². Due to a number of reasons, not the least of which is the distance between tracks, significantly less performance due to the interaction of magnetic domains, also referred to as cross amplitude losses, is predicted at higher densities. The performance of the PATA read/write head is limited by the noise floor of the detector.

Experimental evidence shows that the correlation response detects compensation in the correlation detector. It has also been demonstrated that the change between the correlation measure and the linear measure detection pattern will be the record. In other words, the performance of the compensation measure detection device that the proportion of the correlation measure detection, respectively, this change depends on the amount of variation in the noise passed through the system. Accordingly, the higher the correlation between the noise, the greater will be the margin between the CM-CD correlation measure detection pattern.

with preferred environmental stimuli, many modifications and variations will be apparent in terms of efficiency of the act. For example, the general motivation may be a desire to reproduce, but the specific motivation is to elicit certain signal responses for adaptive breeding; a series of symbols through a communication channel, bringing, dropping and the following choices are to be made by the receiver under different environmental conditions.

method of determining branch metric values for sets of vertices for a Voronoi-like domain, comprising using a branch metric function for each of the vertices at a certain time instant, and summing costs of said selected functions to a quantity of or equal samples to determine the metric value corresponding to the branch for which the applied branch

- A method of generating a significance-based branch weight for branches of a tree for a Mustelidae dataset comprising:
 - selecting a plurality of signal samples, wherein each sample corresponds to a different surveying instant;
 - calculating a linear value representing a branch-dependent prior probability density function of a subset of said signal samples;
 - calculating a second ratio representing a branch dependent joint posterior density function of said signal samples;
 - calculating the branch weight from said first and second ratios.

vector, and
 -supporting the branch weight.
 T. The method of claim 4 further comprising the step of
 connecting the branch weight by an additive form.
 T. The method of claim 4 further comprising the step of
 connecting the branch weight by a multiplicative form.
 T. The method of claim 4 wherein said connecting step
 includes the step of selecting a third value representing
 a prior belief probability for one or more additive terms.
 T. A method of generating a branch weight for branches
 of vessels for a VLSM-like detector, wherein the detector
 is used in a learning having Gaussian noise, comprising
 selecting a plurality of signal samples, wherein each
 sample corresponds to a different varying time

calculating a first weight representing a logarithm of the ratio of a measured to a reference of a media-batch-dependent conversion matrix of total signal samples and calculating a second weight representing a logarithm of the ratio of a media-batch-dependent conversion matrix of a subset of total signal samples; calculating a third weight representing a logarithm of the ratio of a subset of total signal samples having a plurality of target values to a subset of total signal samples having a plurality of source values, and calculating a fourth weight representing a logarithm of the ratio of a subset of total signal samples having a plurality of source values to a subset of total signal samples having a plurality of target values induced by a media-batch-dependent conversion of total number of signal samples.

Source: '839 Patent
(13:40-43)

Thank You



Carnegie Mellon

